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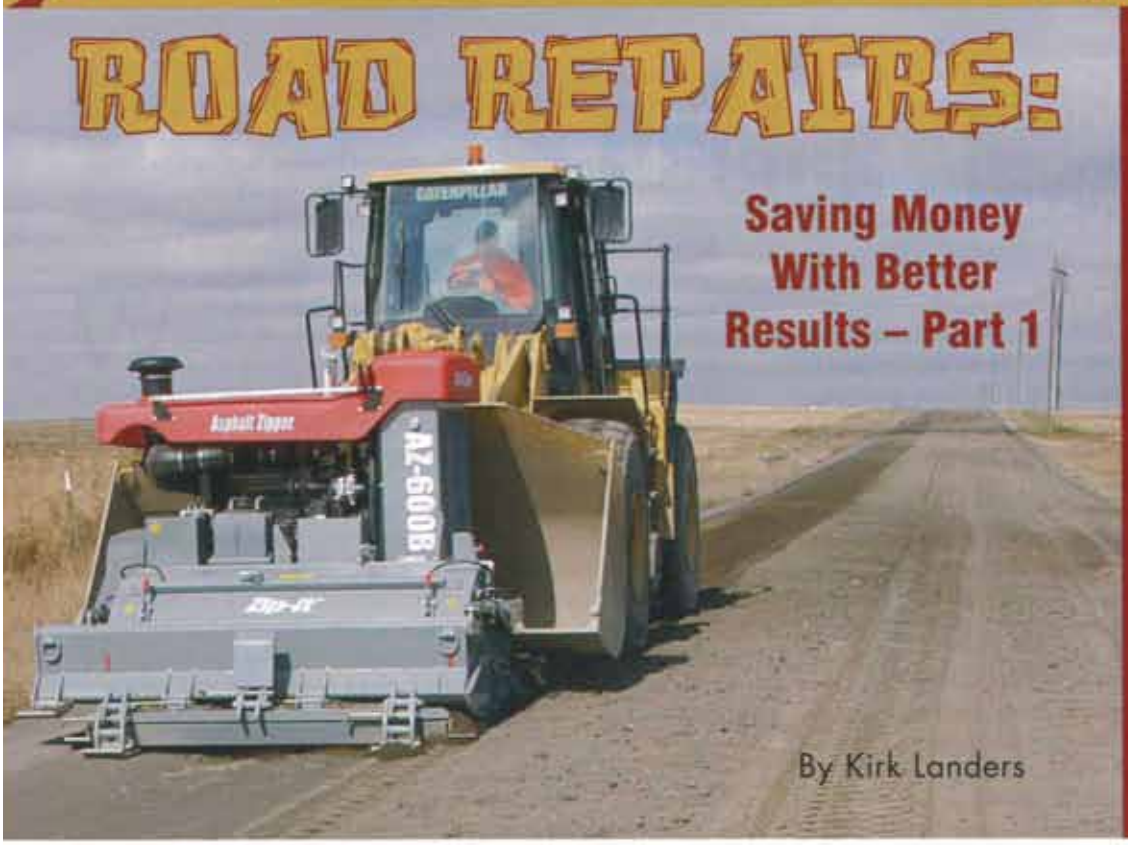
ROAD REPAIRS:

Saving Money With Better Results – Part 1



By Kirk Landers

For Ken Gagnon, the value of full-depth reclamation (FDR) for dealing with distressed township roads had been established long ago. The public works director for the Ontario Township of Guelph-Eramosa in Canada uses FDR to repair sections of pavement that have deteriorated beyond the point where they can successfully be repaired using simple interventions like crack sealing or overlays. Reclamation turns bad road surfaces into excellent base material that is then sealed with a chip seal or an asphalt overlay. The process is fast, minimally intrusive for motorists, and produces a road that outperforms more expensive reconstruction alternatives.

Gagnon's problem stemmed from the fact that his reclamation projects are small—a few lane-kilometers here, a kilometer there—too small to command priority with area contractors. "The best rate we would get is $2.40 per square meter," says Gagnon. "But if we want timely service, we have to pay a premium, and that cost gets prohibitive." Like most road managers in North America today, Gagnon operates on a paper thin budget with no margin for price premiums. He oversees a little more than 220 kilometers (km) of roads, including 42km of urban and semi-urban roads, they are mostly rural roads. Asphalt roads constitute about half of the total inventory; typical construction includes a 6-inch granular base and 90 mm of asphalt placed in two lifts. Double chip seal, surface treatment roads accounts for about 40 km of the inventory and the Township has just over 63 km in gravel roads.

Gagnon has an 11-person road department that is responsible for pavement maintenance, culvert replacement and repair, gravel road maintenance, dust suppression, mowing, ditching, and snow plowing, among other things. Larger projects, like paving, chipsealing, and reclamation, get outsourced to contractors. In 2008, Gagnon decided to try something new. He convinced the Township to purchase a portable reclamation attachment that mounts on the bucket of a wheel loader. Available in working widths from 6 inches to 6 feet, the Asphalt Zipper was created to handle small and medium-size jobs, from pot hole patching to shoulder repair to full lane reclamations of a kilometer or two.

For Ken Gagnon and the Township of Guelph-Eramosa, it turned out to be a perfect solution. The initial investment in the machine was a modest $108,000, and the Township operates it with its existing road department personnel, so it doesn't involve extra costs for labor.

"With the Asphalt Zipper, our reclamation costs have been as low as 32 cents a square meter," says Gagnon. "Our average cost is 50 cents." Compared to $2.40/m2, the best rate the township got from contractors, the Zipper will pay for itself in just 16.2 lane km of work, says Gagnon. Compared to the premium rate for timely service, the payback period is even less.

FDR BENEFITS

Traditional reconstruction methods require the old pavement to be fractured or milled, loaded onto trucks, and hauled away. In the best-case scenario, the old asphalt is crushed, screened, and stored for reuse in an asphalt mix or as a base material. In either, yet again, requiring a further investment of fuel and more use of the roads by heavy vehicles. In the worst-case scenario, the old material is dumped in a landfill, taking up precious space and wasting the original aggregate and asphaltic material, which have decades if not centuries of potential service left in them.

With full-depth reclamation, the original material is processed in place and reused, saving a great deal of time and money, and minimizing the environmental impact of the road intervention. The process uses a reclaiming machine to pulverize the asphalt or chip seal surface and mix it with a measured amount of the base material and just enough water to enhance compaction. After initial compaction, the road is graded to restore cross slope and make any necessary profile grade adjustments, then compacted again and sealed with asphalt or chip seal.

FOR more INFORMATION

For more information on the Asphalt Zipper and the advantages of full-depth reclamation, call 888.zipper.8 or visit www.asphaltzipper.com.

If the project involves special soil or traffic conditions, additives such as Portland cement, lime, or fly ash can be blended into the mix to improve the performance of the new base. Similarly, emulsions or asphalt cement can be used to create an even stronger flexible base. And additional aggregate is sometimes blended into the mix when more material is needed to restore grade or widen the road, or to correct a deficiency in coarse or fine aggregate.

FDR is usually the least expensive way to rebuild an asphalt road that is too damaged to be cost effectively repaired via milling and overlays. Reclamation completely eliminates deep cracks, and with them the potential for reflective cracking. And most basic of all, FDR yields a strong, cohesive stabilized base that makes the roadway stronger, enhancing the performance of the surface treatment and the long-term life expectancy of the road.

Full-Depth Reclamation (FDR) Comparison to Traditional Methods

MATCHING MACHINE AND JOB

Traditionally, reclamation projects are undertaken by large, purpose-built production machines that reclaim pavement in 8-foot or wider swaths. Working in concert with a grader and compactor, these machines can reclaim many lane-kilometers of roadway in a week. The machines are powered by engines in the 350 to 800 horsepower range and weigh tens of thousands of pounds.

Because they do big projects so well, today's mainstream reclaimers have limited capabilities on smaller jobs, especially in the area of cost effectiveness. To move a large production machine to a distant area to patch, say, 500 meters of a two-lane road can be expensive because the cost of transportation, setup and breakdown is so high relative to the amount of work performed on-site.

Similarly, a production machine designed to work in 8-foot or 10-foot or even 12-foot widths is not a good fit for a patching or shoulder job that requires a 1- or 2-meter width. Enter the Asphalt Zipper, created in 1994 specifically to tackle small and mid-size reclamation projects in a cost-effective, simple way. Its applications range from reclaiming road shoulders to full lanes of highway to full-depth pothole patching. ■

For case-study insight into the use of full-depth reclamation by highway crews, check out Part 2 of this article in the next issue.

ROAD REPAIRS:

Saving Money With Better Results – Part 2

By Kirk Landers

In the June issue, the article focused on the process of full-depth reclamation, this month's article recaps some of the case studies in Canada where the technology has been beneficial.

Warrener's Saskatoon Area, one of 15 road management areas in the province, encompasses 26,000 km of roads. The inventory includes gravel roads, thin-membrane surface (TMS) roads featuring a thin layer of asphalt or sealant over a gravel road, granular-base roads with chip seal surfaces, and traditional asphalt roads.

"We use grinding machines like the Asphalt Zipper to rejuvenate failed sections of all types of roads," says Warrener. For TMS and chip seal roads, equipment is used to grind up the old surface and condition the base, which is then compacted, bladed, and sealed. Asphalt roads get similar treatment, but are sealed with asphalt overlays.

For gravel roads, a portable reclaimer is used to dry out distressed areas, often grinding at its maximum 12-inch reclaiming depth. The reclaimed road is then bladed.

"We use the Asphalt Zipper for patching and smaller jobs in isolated areas," says Warrener. "The 20-kilometer reclamation projects get contracted out. A typical project for the Zipper would be a kilometer of two-lane road." Saskatoon-Area crews sometimes employ additives in reclamation work with the Zipper. "Normally we only use additives on bigger jobs," says Warrener, "but occasionally we use them on the work we do with the Asphalt Zipper." The two most common additives they employ are Portland cement and fly ash.

The material is typically spread on the old surface and blended into the mix by the reclaimer's grinding and mixing action in a single pass. Usage of the Asphalt Zipper by Warrener's crews varies each year according to road management priorities. "Last year (2009) was a slow one for that kind of work because we were focused on other types of projects," says Warrener. "We probably put 50 hours on the machine, give or take. In 2008, we used it extensively. In an average year, we'll get 200 to 300 hours of use from it."

CITY OF WELLAND

One of Canada's most recent road agencies to add the Asphalt Zipper to its inventory of road maintenance tools is the City of Welland, near Niagara Falls in Ontario, Canada. Last year, Jerry Boc, the City's manager of public works, and Bob Brown, general foreman of roads, rented an Asphalt Zipper for a test project. Their crew used the machine to reclaim 2,000 feet of surface treated road, 27-feet wide.

The project was completed in 5 hours, including compaction and grading, and the crew ended up completing another 200-foot project the same day.

Welland's road division has 16 employees to maintain about 293 kilometers of asphalt roads and another 103 km of tar and chip. Although Welland crews will use the portable reclaimer on all types of roads, their experience to date has been on tar and chip roads. They pulverize and blend the top 4 to 6 inches of these roads, perform compaction with a vibratory roller as soon as the rough grading is completed, and the final resurfacing is done by another in-house crew.

USING A PORTABLE RECLAIMER

Road contractors throughout North America have adopted portable reclaimers as part of their road construction fleet, and some actually specialize in its use. Utility companies and contractors also have become a primary market for the machine since it enables them to make road cuts and repair them far faster and less expensively than other technology allows.

For each of these users, one of the great benefits of a portable reclaimer is its flexibility. Because of its low initial purchase price, it can be used on an occasional, intermittent basis and still pay for itself in a short time. But because it is a durable, reliable machine built for production applications, it also has the capacity to work hundreds of hours a year for its owner, if the market demands it.

With a portable reclaiming machine in inventory, maintenance crews can rebuild a failed section of road in a timely fashion, enhancing the safety and comfort of motorists in a cost-effective way. While low-cost solutions are of special importance in today's difficult economic climate, the ultimate cost-effectiveness of portable reclamation lies in the quality and durability of the final product, a new road base. The use of additives can create a custom-blended base of superlative quality, but even without any additives, the stabilized base produced by full-depth reclamation is a strong, solid platform for a road surface.

"We have decent base material," says Ken Gagnon of his Township's roads. "So we just mix the pulverized surface with 3 inches of base and some water and compact it. It compacts very well. It's a hard surface. You can't dent it with a heel stomp." ■

FOR more INFORMATION

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